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Regenerative Capacity of Ventral Roots.—Ventral spinal nerve roots were avulsed from the cord in four cats and the animals killed after periods of from four weeks to one year. Evidence of regeneration was sought during life and found in the longest-surviving animal. Reinnervation of the denervated skeletal muscle was demonstrated histologically in the two longest-surviving animals. Evidence of vigorous regeneration on the part of the ventral root fibres was observed either grossly at autopsy or on microscopic examination in all the animals, beginning deep in the rootlet tracts of the cord. The cells of the cord were variously affected, many being destroyed completely, others surviving. The assumption that ventral nerve roots cannot regenerate if avulsed from the cord is, therefore, obviously unfounded as a generality. The evidence invites reconsideration of the potential regenerative capacity of the ventral spinal roots after similar damage in man. (R. M. S.)

Diseases of Muscle.—The case history of an adult with progressive muscular atrophy is presented. The features were typical of chronic anterior poliomyelitis with the unusual feature of onset of disability in infancy. Prostigmine and physostigmine increased the fasciculations in this patient and in other subjects with progressive muscular atrophy. Prostigmine had greater effects on fasciculations than had physostigmine even when the inhibitory effect on choline esterase activity of the serum was the same. It is postulated that the effect of fasciculations is due only partly to the anti-esterase activity of the drugs and that these drugs have a direct action on skeletal muscle. In addition to increasing fasciculations in areas where they already are active, prostigmine and physostigmine may induce fasciculations in areas previously free of them, even when the drugs are given in doses that are without effect in normal subjects. Two patients with progressive muscular atrophy who received large amounts of ascorbic acid excreted in the urine an abnormally low percentage of the administered vitamin. (R. M. S.)

Fascicular Muscle Twitchings.—It is assumed that the injection of procaine into a peripheral nerve blocks completely the passage of stimuli in the motor nerve fibre and from the use of this method in their experiments the authors conclude that the stimuli provoking fascicular twitchings which appear in the muscles of patients with amyotrophic lateral sclerosis appear to be derived mainly from peripheral motor nerve fibres. In patients with numerous fibrillations these stimuli seem to arise from the entire nerve process and probably also to a less extent from the cell body. In other patients, with few fibrillations, the stimuli appear to arise almost entirely from near or at the termination of the nerve fibres. (R. M. S.)

Familial Type of Infantile Paralysis.—A disorder occurring in three siblings, leading in all of them to a fatal termination at the age of two years, is described. The clinical manifestations consisted of (1) progressive flaccid paralysis in which the distal portion of the extremities was least involved and the tendon jerks were not necessarily absent; (2) signs of involvement of the brain stem consisting of strabismus, loss of articulation and difficulty in swallowing; and (3) varying degrees of impairment of mentation. Amaurosis was not present. The clinical diagnosis of Werdnig-Hoffman disease was made in one case. In this case diffuse changes were noted post mortem. They were most severe in the spinal cord, brain stem, and cerebellum. Swelling and disappearance of cells and dendrites were seen. Pathological changes in the glia were pronounced. The pyramidal tracts and portions of the posterior column were partially demyelinated. Hæmatoxylinophilic granules (prelipoid deposits) were observed in both the central nervous system and the visceral organs. The disease appears to be most closely related to amaurotic family idiocy, in spite of certain clinical and pathological differences. Similarities between this and other forms of heredofamilial neurological disorder are pointed out, including the frequent involvement of the phylogenetically younger ascending and descending pathways. (R. M. S.)

Experimental Neuroses and Psychotherapy.—Artificially induced motivational conflicts in animals induce "experimental neuroses," characterized by anxiety reactions, persistent inhibitions, sensory hyperesthesias, phobias, compulsions, and other aberrant behaviour patterns that correspond to those in human psychopathology. These neurotic manifestations are diminished or abolished by various therapeutic techniques which (1) mitigate the intensity of the motivational conflict, (2) decrease the resultant anxiety, (3) force a solution by environmental pressure, (4) furnish a "social example" of more satisfactory behaviour, or (5) provide the animal with manipulative means to "work through" the emotionally conflictful reality situation. These observations are consistent with certain psychobiological principles applicable alike to comparative dynamic psychology, to semeiotic psychiatry, and to clinical psychotherapeutic techniques. (R. M. S.)

Constitution Differences between Patients with Epilepsy.—From a foregoing study of the morphology of the capillaries of the nail fold of 78 deteriorated epileptic patients and 100 epileptic patients without deterioration it may be concluded that the following significant differences between the two groups exist.

1. The so-called normal or simple hairpin-shaped capillary loop occurs more frequently in the nail folds of non-deteriorated subjects than in those of the mentally deteriorated ones.
2. Rudimentary or poorly developed capillary loops are found in a larger proportion of institutional patients than of non-deteriorated ones.
3. Tortuous and bizarre capillaries are significantly more frequent among deteriorated subjects than among non-deteriorated ones.
4. In the mentally deteriorated epileptic patients the incidence of capillary loops in which one limb is much more fully developed than the other is greater than in the mentally normal epileptic patients.

From these observations it is concluded that further evidence has been adduced to support the view that there are constitutional or inborn differences between the deteriorated and the non-deteriorated patient with epilepsy. (R. M. S.)

Distribution of Iodine in Blood Serum and in C.S.F.—Only minute amounts of iodine, less than 0·1 to 0·4 microgram per hundred cubic centimetres, are present in the spinal fluid, in contrast to relatively large amounts, 4·9 to 8·8 micrograms per hundred cubic centimetres, in the blood serum. When the inorganic iodine of serum is increased to more than 100 micrograms per hundred cubic centimetres for days or a week, only a slight rise of 1 to 6 micrograms per hundred cubic centimetres occurs in the spinal fluid unless the protein content of the cerebrospinal fluid is also elevated. There is, therefore, a definite barrier for iodine between the serum and the cerebrospinal fluid. These observations add further evidence indicating the unique nature of cerebrospinal fluid as compared with the other body fluids. They illustrate the peculiarly selective properties of the blood-cerebrospinal fluid barrier. (R. M. S.)

Functional Representation in Nuclei.—Electric stimulations and lesions were made in the oculomotor and trochlear nuclei of monkeys. These experiments indicate that individual ocular muscles are functionally represented within the ipsilateral oculomotor nucleus, while the superior oblique muscle is governed by the

contralateral trochlear nucleus. The dorsoventral and rostrocaudal arrangement of functional representation of the ocular muscles is as follows: (1) sphincter pupillæ; (2) inferior rectus; (3) ciliary (?); (4) inferior oblique (?); (5) internal rectus; (6) superior rectus; (7) levator palpebrarum; (8) superior oblique (contralateral). (R. M. S.)

Fatalities following Electric Convulsive Therapy.—Two fatalities following electric shock treatment are reported. In the first case death was due to coronary occlusion and myocardial infarction. In the second case the general autopsy observations were without significance. It was assumed that the fatal outcome was due to post-convulsive respiratory arrest. Both cases showed rather widespread but not serious, histological changes in the brain. The pathogenesis and the significance of the histological changes are discussed. The importance of repeated careful investigations of cardiac function in patients who are considered for electric shock treatment is emphasized. (R. M. S.)

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Amyotrophic Lateral Sclerosis.—In cases of amyotrophic lateral sclerosis there appears to be a close correlation of the number of muscular fibrillations and the speed of the progress of the disease. Primary lateral sclerosis and progressive muscular atrophy both without muscular fibrillations, ran a course similar in many ways to that of amyotrophic lateral sclerosis, except that it was more slowly progressive. It is suggested that the patients with slowly progressive muscular atrophy without muscular fasciculations were suffering from an arrested or a slowly progressive type of amyotrophic lateral sclerosis, approximately 10 per cent. of the cases falling into this group. Data are also presented which suggest that an occasional patient with the clinical picture of amyotrophic lateral sclerosis recovers. (R. M. S.)

Histogenesis of Early Multiple Sclerosis Lesions.—The author demonstrates rather strikingly the frequent association of the early lesions of multiple sclerosis and vascular disturbances. The latter consisted of thrombosis of small veins and dilatations, engorgement and stasis of the capillaries and veins. The great majority of small lesions have been observed to be orientated about small veins. The question arises why vascular disturbances, which can be considered as of frequent occurrence in small and recent plaques, are relatively infrequent in the large and older lesions. Two factors appear to be of importance: (1) In elongated lesions containing central veins the patches never tend to follow the entire course of the blood vessel. The foci usually envelop the central vein for a short and limited distance and as the lesion becomes larger the relation with the primary blood vessel becomes less evident. (2) The presence or absence of vascular changes in lesions may depend on the duration of the morbid process; thrombi of the small veins in older lesions may disappear without a trace. (R. M. S.)

E.E.G. and Changing Blood Sugar Level.—A study of electro-encephalograms on forty healthy college students under varying conditions, emphasizes the close relationship of the electro-encephalographic reactions to low blood sugar and to hyperventilation and also the dependence of both reactions on individual differences revealed by careful examination of the routine electro-encephalogram. (R. M. S.)

Insulin and Epinephrine Tolerance Tests in Schizophrenics.—An investigation was made of the glycæmic and autonomical reactions of 32 schizophrenic and 20 normal men; 41 per cent. of the patients showed some degree of resistance to insulin. The reactions to hypoglycæmia were the same in the two groups. A lessened reactivity in blood sugar following the injection of epinephrine was noted in the patients. In general, the normal subjects showed greater changes in the blood pressure and pulse rate, paralleling the differences in the blood sugar between the two groups. (R. M. S.)

Cerebral Dysrhythmia and Eclampsia.—Thirteen, or 65 per cent., of twenty patients with eclampsia had electro-encephalograms indicative of cerebral dysrhythmia, as compared with two, or 10 per cent., of twenty patients with pre-eclampsia. It is suggested that a primary cerebral dysrhythmia may be present in patients having the syndrome of eclampsia, and that the associated toxæmia may be the " trigger mechanism " that exaggerates the inherent dysrhythmia to the degree that convulsions appear. (R. M. S.)

Intracranial Epidermoids Below and Above Tentorium.—A review of the literature revealed 205 cases of intracranial epidermoids. Of this number, seven instances have been recorded in which the lesions was situated in both the supratentorial and the infratentorial position, and to these the eighth example is added. It is suggested that the term " cutaneous proliferating cyst " (Paget) would be an acceptable designation for the neoplasm now called epidermoid, or cholesteatoma. (R. M. S.)

Pseudo-Jacksonian Epilepsy.—An apparently specific epileptic syndrome occurring in children is described. It consists of repeated clonic jerkings of the extremities of one side of the body, starting abruptly and simultaneously in the arm and the leg, without " march " or loss of consciousness. The attacks occur with a rather constant frequency in each case, several to many times daily. Hemiparesis on the side of the seizures developed at one time or another in each of the cases studied. Pneumo-encephalograms revealed mild diffuse hypoplasia of the affected brain in 6 of 7 cases. In one case a subcortical calcified, degenerated area was revealed. Pacchionian granulations appeared unusually dense in four cases. Treatment with phenobarbital or dilantin was usually without effect on the seizures. Lysis of the abnormal pacchionian granulations produced decided improvement in 3 of 4 cases, and removal of the calcified mass gave relief from both seizures and hemiparesis in another case. (R. M. S.)

Midbrain Deafness.—As a rule, lesions which produce deafness involve the eighth nerve or its terminal filaments; they may, however, cause impairment of hearing when confined to the brain stem. In a case of sudden and complete deafness a glioma was found infiltrating the tegmentum of the midbrain. The other localizing signs were the presence of sluggishly reacting pupils, which later became unequal and fixed, and pathological drowsiness and mental symptoms resulting from involve-

ment of the hypothalamus. In addition, extension of the tumour to the medulla gave rise to weakness of the soft palate and dysphagia. An unusual feature of the case was the absence of increased intracranial pressure. This was explained by incomplete occlusion of the aqueduct of Sylvius. (R. M. S.)

Paraphenylenediamine Poisoning.—A case of paraphenylenediamine poisoning following the use of a popular hair dye named " ursol " is reported. In addition to the typical clinical and pathological changes following such an intoxication, neurological signs and symptoms, with pathological changes in the nervous system, also developed. The most important of these changes was the oxidase reaction, resulting in deposits of pigment granules in the nerve cells of the pallidum, the striatum, the hypothalamus and the dentate nucleus. (R. M. S.)

Treatment of Schizophrenia.—Sixty-six patients suffering from schizophrenia were given insulin shock therapy, and the results were compared with those for a group of 132 patients treated by conservative methods. Analysis of the subsequent courses for the two groups showed similar remission rates. Insulin shock therapy by the method described does not increase the remission rate of schizophrenia over that with more conservative methods of treatment. (R. M. S.)

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Experimental Studies on Headache.—The authors produce convincing evidence in favour of the view that the headache associated with either decreased or increased intracranial pressure results from traction on or displacement of pain-sensitive intracranial structures and is independent of generalized intracranial pressure changes *per se*. (R. M. S.)

Predisposing Factors in Bromide Intoxication.—The hypothesis is advanced that there is a synergistic relationship between the phenomena referable to bromide intoxication and the underlying organic lesions. It is concluded that in the great majority of the cases a distinct etiological significance is to be ascribed to the pre-existing pathological conditions. (R. M. S.)

Sequels of Equine Encephalomyelitis.—A review of the literature demonstrates that neurological sequels of a chronic and progressive nature may follow the acute infection in cases of equine encephalomyelitis. A clinico-pathological study of such a case is presented. In this case, the lesions consisted chiefly of a destructive process which had produced multiple glia-lined cavities within the frontal lobes and widespread degeneration of the parenchymal elements throughout the brain. Many of the vessels were occluded by an endothelial increase or by deposition of calcium within their lumens. The extensive vascular damage, with occlusion of the lumens and ischemia, appears to be the primary cause of the tissue damage in this disease and suggests a vascular spread of the virus. (R. M. S.)

Treatment of Schizophrenia with Dilantin.—Sixty psychotic patients, chosen as representing clear and typical instances of the more important major psychoses, were treated with dilantin in doses increased up to the point of tolerance. Improvement occurred in over half the patients during the period of treatment. It consisted usually of diminution of excitement and irritability, almost irrespective of the type of the psychosis. The patients tended to relapse when the drug was withdrawn. These results seem to justify a further study of the use of dilantin for psychotic states. (R. M. S.)

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Grouping Behaviour of Normal Persons.—Further analysis has been made of the grouping behaviour of normal subjects and of persons with lesions of the brain from the series previously reported by one of the authors (W. C. H.). Groups of geometrical test figures having certain characteristics in common were presented by means of a special apparatus. Both qualitative and quantitative evidences of deviation from normal performance were found in some of the experimental subjects. This evidence is in line with the earlier observations of Halstead obtained on these subjects. Various factors bearing on interpretation of the present results are discussed. (R M. S.)

Calcification of Cerebral Cortex.—The clinical and pathological features of a case of Alzheimer's disease complicated by the presence of a large meningioma of the olfactory groove are presented. The suggestion is made that the association of calcification of the cerebral cortex with the meningothelioma is part of a pathological complex and not a mere coincidence. The association of the Dimitri-Weber calcifications in the brain with pathological conditions other than vascular nevi in the region of distribution of the trigeminal nerve (Sturge-Weber syndrome) is reviewed. (R. M. S.)

Pentobarbital Treatment of Neurogenic Hyperthermia.—Bilateral injury to the rostral region of the hypothalmus in a series of monkeys results in an acute post-operative rise in body temperature which, if untreated, proceeds to a fatal level. This experimental hyperthermia is the result of central paralysis of the heat loss mechanism, associated with maintained or exaggerated activity of the central mechanism for heat production and heat conservation. Intravenous administration of soluble pentobarbital (pentobarbital sodium) during the course of the hyperthermia suppresses the activity of the mechanism for heat conservation and heat production and reduces body temperature to the normal level.

When administered subcutaneously, pentobarbital is relatively ineffective. The striking efficacy of pentobarbital in reducing experimental hyperthermia in the monkey warrants its trial in the treatment of neurogenic hyperthermia following acute injury to the brain in man. (R. M. S.)

Myasthenia Gravis.—The myasthenic patient exhibits a pronounced sensitivity to curare. One-tenth the usual physiological dose of curare produces profound exacerbation of existing symptoms, and generalized curarization adds new symptoms of myasthenia. These phenomena suggest a specific diagnostic test for the disease. Injection of one-tenth the usual physiological dose of standardized curare is a safe procedure if followed by administration of prostigmine methyl-sulphate. Larger doses must be administered with caution, as fatalities may occur. Five patients with different phases of the myasthenic syndrome have shown a specific response to the curare diagnostic test, even though for some the prostigmine test was inconclusive. The cause of myasthenia gravis should be found by explaining the occurrence in the disease of the neurophysiological disturbance resembling chronic curarization. (R. M. S.)

Disturbances in Parotid Secretion.—In this communication the authors describe a method of measuring the disturbance in parotid secretion in an unusual syndrome involving the artery of the facial nerve—a branch of the anterior inferior cerebellar artery. Their results indicate that the motor nerves of the parotid gland do not have bilateral representation in the brain stem, as was suggested by Kohnstamm on the basis of animal experiments. (R. M. S.)

Treatment of Post-Lumbar-Puncture Headache with Ergotamine Tartrate.—Ergotamine tartrate, at least according to these data, is of value in relieving post-lumbar-puncture headache in eight- to nine-tenths of the patients only when the drug is administered according to the tolerance of the particular patient for the drug. Each person differs in this respect and one must administer the drug as carefully as one rapidly digitalizes a patient or as one administers morphine sulphate to a patient with acute myocardial infarction. (R. M. S.)

Juvenile Amaurotic Idiocy.—A case of the juvenile type of amaurotic family idiocy is described. An attempt is made to correlate the results of neurological, psychological, encephalographical, and histological studies, with particular reference to cortical activity. In spite of severe and widespread cellular alterations many cortical functions were retained, and the electro-encephalographical pattern was not especially impaired. (R. M. S.)

Comparison of Metrazol with Electric Shock Treatment of Schizophrenia.—Approximately the same results were obtained in 100 schizophrenic patients treated with electric shock as in a similar group of patients treated with metrazol. Two to eighteen months after treatment was completed, 32 patients were improved and 68 were unimproved. There is a pronounced tendency to relapse in schizophrenic patients treated with convulsive shock therapy. While amelioration of psychotic symptoms and behaviour occurs in many patients, the essential schizophrenic pattern remains unchanged. Convulsive shock therapy helps to achieve remissions earlier than routine institutional treatment and therefore diminishes the duration of hospitalization. Electric shock therapy is preferable to metrazol therapy, as has been pointed out by many workers, because there are amnesia for the treatment, less fear and anxiety, painless shock and avoidance of repeated intravenous injections in resistive patients. Its greatest value consists in aiding in the preparation of unco-operative patients for other therapeutic measures, such as psychotherapy, occupational and recreational therapy, and general psychiatric management. (R. M. S.)

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Diseases of Muscle. XII.—The heredity of progressive muscular dystrophy was studied in 75 families, in which a total of 125 members were affected with the disease; 54 per cent. of the 125 patients gave a history of at least one other member of the family affected with the disease; of the 85 patients who were examined, 25 per cent. gave a positive familial history of the disease. More males had progressive muscular dystrophy than did females. The ratio of males to females was 3 : 1. Twenty-six males inherited the disease by a simple sex-linked recessive factor; e.g. the muscular dystrophy appeared in the males but was transmitted by apparently healthy females. In 7 males and 7 females transmission of the disease was by a dominant hereditary factor.

The exact mechanism of heredity in 61 males and 24 females was not determined, but was of a recessive type. It is postulated that in this group inheritance in many instances was by a simple sex-linked recessive factor. Another possible type of hereditary transmission is one of multiple recessive factors in which the number of factors necessary to induce the condition is fewer for males than for females. There was a definite relation between the age of the patient when the symptoms first were noticed and the clinical course of the disease. In patients in whom the disease appeared early in life disability developed much faster than it did in patients in whom the first symptoms appeared at a later age. In the present series, the patients whose inheritance of the disease was by a dominant hereditary factor manifested their first symptoms relatively late in life. In these patients the progress of the disease was slow and investigations showed that the disease remained localized to certain muscle groups for long periods. In contrast, when progressive muscular dystrophy developed early in life the process usually became extensive in distribution and involved most of the muscles early in the course of the disease. (R. M. S.)

Studies in Diseases of Muscle. XVIII.—A family in which progressive muscular dystrophy of atrophic distal type developed in 12 members is reported. The onset of symptoms usually was at about the age of 33 years (from 28 to 43 years). The muscles earliest and most severely affected were those of the legs and feet. Heredity was by a dominant factor. Autopsy observations in one case were similar to those often made in cases of progressive muscular dystrophy. (R. M. S.)

Spinal Necrosis of Obscure Origin.—Necrosis or softening of the spinal cord has been described by numerous observers. Aside from the cases in which the cause was known to be thrombotic, traumatic, toxic, or infectious, a general group may be considered in which the etiological factors are obscure. These have been recorded under various headings, such as acute or subacute necrotic myelitis, progressive necrosis of the spinal cord, myelomalacia and myelodegeneration. There is little agreement regarding the etiological factors or the

nature of the pathological changes. The literature is reviewed, and four case studies are presented to indicate the general clinical pictures and the predominant pathological changes. It is suggested that in many of the cases reviewed, as well as in those presented, toxi infectious causative factors and tissue reactions appear to exist. No specific agent has as yet been identified, but the possibility of its existence should be considered. (R. M. S.)

Fate of Ganglion Cells in Infantile Amaurotic Family Idiocy.—Investigation of several cases of infantile amaurotic family idiocy has revealed the existence of inclusion bodies and severe secondary cell degeneration. The inclusion bodies are partly argentophilic and partly argentophobic, depending on the kind of fat which forms their basis. In cases in which inclusion bodies are present there are almost myoclonic states. Precipitations outside the cells are caused by degeneration of axons. It cannot be definitely decided whether there are also precipitations from the tissue fluid (Alzheimer and Stürmer). The clinical signs in cases of infantile amaurotic family idiocy are due only in part to the well-known cell changes, which affect merely the vegetative, and not the functioning, portion (fibrils). Only when the functioning part also is affected do neurological signs appear. The atonic asthenia, like that in myasthenia or in Addison's disease, is to be explained by a disturbance in cholinergic and adrenergic factors, obviously the result of changes in the thymus and the adrenals which are observed with infantile amaurotic family idiocy. (R. M. S.)

Pathways for Pain from Stomach of Dog.—In this study an effort was made to outline the neurological pathway for mediation of the pain which follows distention of the stomach in the dog. Pain was produced by distending the stomach with an air-filled balloon. The results of this investigation indicate that visceral afferent nerve fibres only are involved in the mediation of the pain which follows distention of the stomach in the dog and that they are contained within the greater splanchnic nerve. The majority of these fibres traverse the rami communicantes of the eighth through the thirteenth thoracic spinal nerve and enter the spinal cord through the corresponding posterior roots. Evidence was presented which indicates that some of these fibres traverse the sympathetic trunk as far cephalad as the fourth thoracic and as far caudad as the third lumbar sympathetic ganglion. These particular fibres undoubtedly enter the spinal cord over the rami communicantes and the corresponding posterior roots of the fourth through the seventh thoracic and the first through the third lumbar spinal nerve. (R. M. S.)

Demyelinated Plaques Associated with Cerebral Fat Embolism.—In a clinical and pathological consideration of cerebral fat embolism emphasis is placed on the diffusely scattered patches of demyelination, which are considered to be a constant and striking histopathological feature of the disease. The lesions of cerebral fat embolism are of two varieties: (**a**) miliary anæmic infarcts, which result in focal areas of necrosis (destruction of all tissue elements), and (**b**) focal areas of demyelination with partial preservation of the nerve parenchyma (nerve cells and nerve fibrils) and early signs of glial repair. The lesions of cerebral fat embolism are considered to be similar to the early lesions of multiple sclerosis. (R. M. S.)

Occlusion of the Anterior Inferior Cerebellar Artery.—The same principles of diagnosis, so well known for the other vascular syndromes of the brain stem and cerebellum, seem to apply in cases of occlusion of the anterior inferior cerebellar artery. The onset of the disorder is usually sudden, with or without premonitory symptoms, and usually is unaccompanied by any loss of consciousness. Vertigo is the first and most important symptom and is often associated with nausea and vomiting. The other symptoms of facial paralysis, deafness, sensory disturbance and cerebellar asynergia appear in a few hours but may not all attract the attention of an unobservant patient. The diagnosis is at once obvious because of the association of signs of ipsilateral involvement of the cranial nerves and cerebellum. The clinical course is one of gradual improvement over a variable period, and rarely is the condition fatal except as it provokes other complications, such as bronchopneumonia, or is part of extensive hypertensive vascular and renal disease. Notable by their absence are all signs pointing to involvement of the corticospinal tracts and medial lemnisci, which receive their blood supply from midline tributaries of the vertebral and basilar arteries. As far as can be ascertained, the symptoms are related chiefly to softening of the lateral portions of the brain stem and cerebellar peduncles rather than to involvement of the cerebellar hemisphere. When an infarct is limited to the cerebellar hemisphere, vertigo may be the only clinical manifestation, or such a lesion may pass unnoticed and be unexpectedly discovered at autopsy. (R. M. S.)

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E.E.G. Foci Associated with Epilepsy.—Electro-encephalographic studies were carried out on a random sample of 1,161 epileptic patients. Clinical evidence of localized damage to the brain was fifty-eight times as common in epileptic patients with electro-encephalographical foci as in patients in whom the disturbance was generalized or absent. The same types of seizure discharge or other electro-encephalographical abnormality were encountered in cases with focal electro-encephalographical activity as in cases with non-focal disorders. However, certain types of abnormality, notably irregular $\frac{1}{2}$ to 3 per second activity, spikes and 2 per second waves and spikes, were much commoner in focal than in non-focal records. The presence of one of these three types of abnormality is presumptive evidence of localized damage to the brain. (R. M. S.)

Electrical Stimulation and Atrophy of Denervated Skeletal Muscle.—From their experiments on albino rats, the authors conclude that electrical stimulation is effective in reducing the loss of weight of denervated muscle. Of the types of current tried, the 25-cycle alternating (sinusoidal) current produces the best results with respect to retention of weight, and the 60-cycle current is second best. Neither galvanic nor faradic current performs consistently better than the other.

Both are inferior to the 25- and the 60-cycle sinusoidal current. The effectiveness of the treatments increases with the number of treatments daily. This relationship is apparently linear. No sensible differences in results are obtained by varying the length of the treatment within the limits employed (one to five minutes). (R. M. S.)

Interaction of Electric Shock and Insulin Hypoglycæmia.—The authors' experiments give additional proof of the greatly increased excitability of the sympathetic centres in hypoglycæmia. (R. M. S.)

Corpus Callosum.—In 22 cases of epilepsy in which the frontal lobes were relatively intact, partial and complete section of the corpus callosum did not result in forced innervation or forced grasping. In three cases of chronic unilateral lesions involving the anterior portion of the hemisphere, partial or complete section of the corpus callosum resulted in the temporary appearance of forced grasping in the contralateral hand. This was associated with an ideokinetic dyspraxia in two cases and with exaggeration of a pre-operative kinetic dyspraxia in the third case. There may be a close relation between forced grasping and dyspraxia. (R. M. S.)

Experimental Swelling of Brain.—Acute swelling of the brain was produced in dogs by lesions of the lower part of the fourth ventricle and the medulla. This swelling usually appeared with a simultaneous rise in blood pressure, but later the swelling persisted in spite of the fall in blood pressure. The blood flow through the brain did not show any marked or persistent change in the majority of the experiments. There was an increase in water content of the gray and the white matter of the swollen brain. The intravenous injection of hypertonic solutions reduced swelling of the brain in most of the experiments. The only significant histological change was dilatation of the perivascular spaces. The possible explanation of this experimental swelling of the brain induced by lesions of the fourth ventricle is discussed. (R. M. S.)

Schizophrenic Language.—The writer concludes that in paranoid schizophrenia the language material of the patient is definitely autistic. (R. M. S.)

Dextrose Tolerance Curves with Manic Depressive Psychosis.—The authors' observations permit the conclusion that abnormal oral dextrose tolerance values for manic-depressive patients are attributable to delayed absorption of dextrose from the gastro-intestinal tract and cannot be accepted as evidence of an intrinsic disorder of carbohydrate metabolism. (R. M. S.)

Involvement of Posterior Cord of Brachial Plexus.—The syndrome of involvement of the posterior cord of the brachial plexus does not correspond to either the upper or the lower arm type of lesion of the brachial plexus, but shows evidence of involvement only of those muscles which are supplied by the branches of the posterior cord of the brachial plexus. (R. M. S.)

Encephalopathy following Administration of Arsenical Preparations.—The four cases presented by Boyd and Nie lend support for the hypothesis advanced by Globus and Ginsburg that in arsphenamine encephalopathy all the cerebral disturbances are on the endothelial lining of the capillaries and that vascular injury is the essential factor in the various reactions. (R. M. S.)

Retrograde Degeneration.—Retrograde degeneration, implying breakdown and disappearance of axons, has not been observed to occur in the long motor or sensory tracts of the spinal cord of the cat or monkey within ten months after hemisection. Thus the author's results are not in harmony with the view that the cells of origin disappear quickly, or at all, when the axons of a tract in the cord are sectioned. (R. M. S.)

Cervical Syringomyelia Associated with Arnold-Chiari Deformity.—Compression of the neuraxis at or about the level of the foramen magnum may result in a variety of histopathological states. In many instances the anatomical picture resembles that of syringomyelia, and in some cases the clinical picture is indistinguishable from that produced by the latter disorder. Platybasia and true syringomyelia may be co-existent pathological states, and the lack of continued improvement after decompression of the foramen magnum may be due to the primary disease of the spinal cord. (R. M. S.)

Permanent Damage following Polyradiculo-neuritis.—A clinicopathological study of a case of polyradiculo-neuritis is reported. Recovery from the acute phase of the disease was followed by neurological signs indicating degeneration of the posterior column of the spinal cord. The patient died nineteen months after the onset of his neurological symptoms of an intussusception of the small intestine. Pathological study of the nervous system disclosed loss of ganglion cells in the posterior root ganglia with degeneration of the posterior column of the spinal cord, the posterior nerve roots, and the peripheral nerves, without inflammatory reaction. The observed pathological changes were not regarded as characteristic of any known disease affecting the nervous system. (R. M. S.)

Myasthenia Gravis.—Two cases of Myasthenia Gravis reported by Riley and Frocht constitute the fourth instance reported in medical literature in which more than one member of a family was involved. It is believed that a more careful search and a complete history in each case of myasthenia may reveal additional data concerning a tendency of this disease to develop in more than a single member of a family. (R. M. S.)

BRAIN

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*Studies of Neuromuscular Disorders: The Myogram, Blood Cholinesterase and Effect of Prostigmine in Myasthenia Gravis and Progressive Muscular Atrophy. G. Odom, C. K. Russel, and D. McEachern. 1.
*Subdural Empyema. C. S. Kubik and R. D. Adams. 18.
*On the So-called "Laryngeal Epilepsy." C. W. M. Whitty. 43.
*Genetic and Familial Aspects of Dystrophia Myotonica. O. Maas and A. S. Paterson. 55.

Neuromuscular Disorders.—Myograms were obtained from 11 patients with myasthenia gravis, six with progressive muscular atrophy, two with chronic thyrotoxic myopathy, and from normal subjects. The limb was immobilized and the motor point of the ulna nerve stimulated electrically. Blood cholinesterase was determined and the effect of prostigmine, injected into muscle and artery, was observed. The characteristic myograms of myasthenics exposed to rapidly repeated stimuli became normal 45 minutes after intramuscular injections and immediately after intra-arterial injection. In the latter case the myogram remained normal after the blood cholinesterase had risen to the pre-injection level, from which it had fallen as a result of the prostigmine. It is thought that the persisting effect is due to persistent lowering of muscle cholinesterase. The blood and serum cholinesterase was not abnormal in either myasthenia or progressive muscular atrophy, and in both the fall paralleled the dose of prostigmine. Fasciculation in progressive muscular atrophy seems to be due to a peripheral change, and the suggestion is made that the neuronal degeneration sensitizes the muscle to the normal amounts of acetyl choline present in resting muscle. The fasciculation which follows injection of prostigmine in normal subjects also has a peripheral origin. (D. J. W.)

Subdural Empyema.—Fourteen cases of subdural empyema, 12 with autopsy, are described and related to previously reported cases. The infection arose in the

paranasal sinuses in 12, and in the ears in only one case. This is in contrast to some other authors, who blame aural infection for most cases. There is a well-defined and fairly consistent syndrome of sinusitis followed by orbital swelling, headache of increasing severity, a high temperature, neck rigidity, increasing drowsiness, hemiplegia, and Jacksonian attacks, often with paralysis of contralateral deviation of the eyes. The C.S.F. pressure is raised with a moderate polymorphonuclear leucocytosis and raised protein. Death occurs in about a week. The infection was by direct extension through the dura or by cerebral thrombophlebitis. The pus covered the hemisphere and there was severe ischæmic necrosis of the underlying grey and even white matter. Treatment should be by drainage through a lateral frontal craniotomy. (D. J. W.)

" **Laryngeal Epilepsy.**"—Four cases of fits following a period of coughing are described. The name laryngeal epilepsy is preferred to Charcot's laryngeal vertigo, since the condition appears to be primarily epileptic. It is either true reflex epilepsy, epilepsy with a laryngeal aura, or in some cases the onset of a fit in a predisposed person as a result of venous congestion. The theories that the fits are caused by forced expiration giving asystole, simple venous congestion, or anoxæmia, are dismissed as unlikely. (D. J. W.)

Genetic and Familial Aspects of Dystrophia Myotonica.—The families of 94 patients with myotonica have been surveyed as completely as possible. In these families 261 individuals showed definite signs, and 285 others were considered to have suspicious symptoms. The authors consider myotonia atrophica and congenita the same disease. Of 356 members of the families examined personally 236 were affected, 103 were suspicious, and only 17 unaffected. Some of the signs employed in recognizing the second group were slight and had never progressed; they included, for example, an abnormally weak grip. The statistics completed have been analysed exhaustively. It is concluded that the disease is transmitted as a dominant, it does not skip generations, it is transmitted equally by males and females, and multiple hereditary factors are involved. (D. J. W.)

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Afferent Areas in Brain of Ungulates.—The cortical discharges resulting from stimulation of discrete areas of the body have been observed in different animals. The areas of the cerebrum from which the discharges were obtained have been mapped out and correlated with the sites of stimulation. The experiments were made upon two goats, sheep, pigs, and Shetland ponies.

In all these animals the largest area of the sensory cortex received afferents from the snout area. The distal extremities had the next largest area, and the body little or none. There were species differences. In the goat and sheep the largest supply was from the homolateral upper and lower lip, but the feet were represented contralaterally. In the pig the whole of the cortical sensory area seems to be taken up with the representation of the contra-lateral half of the snout. The ratio of the sensory surface to the cortical receiving area suggests that the tactile discrimination of the snout may be greater than that of the human hand.

The relatively poor representation of all other areas of the body in these animals seems to be related to their method of feeding and to the stereotype function of the limbs in locomotion and posture. By contrast discharges reach the cortex from most of the exposed parts of the body in carnivores. In the pony, although the position of the receiving area was like that of the sheep and the goat, it mainly represented the contra-lateral nostril. There was also representation of most of the limb surfaces.

The ipsilateral representation of the lips in the sheep and goat may be due to the dominance of smell, which has ipsilateral representation, rather than sight as a guide to feeding. In the pig and the horse the contralateral representation of the nostrils may be explained by their use for tactile exploration in conjunction with vision, which is represented contra-laterally. (D. J. W.)

Representation of Movements in Motor Cortex.—The experimental and clinical evidences of the way in which movement is represented in the cerebral cortex are reviewed at length. Arguments are presented which support the original theories of Jackson which were based on the conception of a motor cortex in which there is a complex pattern of overlapping and graded representations of movements, rather than the view, which has arisen from more recent exploration of the cortex, which suggests a punctate representation of the body in the cortex in the form of a mosaic of abrupt localizations. The view is expressed that the normal combinations and sequences of movement are represented in the cortex on a plan of wide and overlapping fields, each of which has a focus where the movements of one part are mainly, but not exclusively, represented. Points surrounding this focus may yield the same movements on stimulation as does the focal point, but as the threshold for the response varies with the distance from the focus the subsidiary points in the area of representation only produce the movements in special circumstances. Thus, although there is anatomical representation of movements in the cortex, the exact area of cortex which is subserving a movement depends upon the physiological conditions existing from moment to moment.

The variations in the response of a fixed cortical point to experimental stimulation are not due to any change in localization but to variations in the threshold of excitability of the movements represented there. These variations are produced by facilitation of response, and by deviation of response to another point, which is consequent upon facilitation. (D. J. W.)

Indirect Injuries of Optic Nerve.—A clinical study has been made of 46 cases of indirect optic nerve injuries. The optic nerve is injured in about 1·5 cases of head injury. In cases with partial injury visual acuity may be practically normal, but small scotomata may be present. The injury which gives rise to indirect optic nerve damage is almost invariably frontal, and in only a tenth of the cases was there radiological abnormality of the optic foramina. The view is held that the injuries to the nerve are secondary to intraneural vascular damage. (D. J. W.)

Reflex Studies in Electrical Shock Procedure.—The superficial and deep reflexes have been elicited after electrical shocks in 200 psychiatric patients. Immediately after the convulsion the tendon jerks, particularly the knee jerks, are increased, but the supinator jerk is almost invariably suppressed. At the same time the superficial reflexes disappear and the plantar response, after transitory disappearance, becomes extensor. The corneal reflex is not affected, but a powerful grasp reflex can be obtained. There is wide individual variation in the degree of reflex change, its character and its time of restoration to normal, although the intensity of electrical current used is constant. (D. J. W.)

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Nitrogen Retention in Simmonds' Disease.—Four patients with Simmonds' disease have been treated by methyl-testosterone and marked improvement occurred clinically and changes in chemical metabolism were demonstrated. (J. N. C.)

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Relationship of Dehydration of Blood Plasma to Collapse.—It was found that during artificial fever therapy the incidence of collapse could be reduced by the replacement of sodium chloride lost in the sweat. A useful guide for control of amounts required was by measurement of the plasma specific gravity. (J. N. C.)

Prolongation of Action of Subcutaneously Injected Medicines.—The addition of suitable concentrations of zinc given with posterior pituitary extract, with epinephrine or thiamin resulted in prolongation of the action of each of these substances. (J. N. C.)

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A Neuropsychiatric View of German Culture. R. M. Brickner and L. Vosburgh Lyons. 281.
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*Cortical Response of the Anesthetized Cat to Gross Photic and Electrical Afferent Stimulation. W. H. Marshall, S. A. Talbot, and H. W. Ades. 1.
*The Effect of Skeletal Fixation on Skeletal Muscle. D. Y. Soldnat, R. C. Partridge, and J. Hunter. 17.
*Intravenous Potassium, Calcium and Magnesium and the Cortical Electrogram of the Cat. M. A. Rubin, H. E. Hoff, A. W. Winkler, and P. K. Smith. 23.
Thermo-Regulatory Pathways in the Cat Brain Stem. L. E. Beaton, C. R. Leininger, and W. A. McKinley. 29.
Spinal Distribution of Thermo-Regulatory Pathways in the Monkey. L. E. Beaton and C. R. Leininger. 37.
*The Response of Single Auditory-Nerve Fibers to Acoustic Stimulation. R. Galambos and H. Davis. 39.
A Secondary Acoustic Area in the Cerebral Cortex of the Cat. H. W. Ades. 59.
The Pseudaffective State and Decerebrate Rigidity in the Sloth. Britton and R. F. Kline. 65.

Cortical Response to Gross Photic and Electrical Stimulation.—Cortical responses to brief photic and electrical stimuli applied to the optic nerve were studied in the cat. The responses are usually predominantly surface positive, positive phase first. In light anæsthesia negative components are prominent. The positive component is associated with ascending cortical processes, the negative with descending neural processes. The components of the surface positive wave may be assigned to activity in different layers of the cortex. The separateness of the positive and negative processes can also be shown by cross-conditioning of the cortical mechanism, wherein a photic stimulus applied to one eye is succeeded by an electric shock applied to the opposite optic nerve. The positive components evoked by the latter reaction are subnormal, but the negative component may be greatly facilitated. Facilitation of the negative wave mechanism may build up over a period of several hundred msec. If the excitability is raised with picrotoxin the negative wave moves by steps to the first primary response. Both photic excitation of the retina and electrical excitation of the optic nerve evoke primary responses over both striate and extra-striate (or peristriate) regions. The extra-striate reactions in the suprasylvian cortex are in part due to association pathways from the striate and in part to projections from the lateral geniculate or neighbouring nuclei. The predominant negativity of the photic cortical response in some cats cannot yet be adequately explained. (W. M. H.)

Skeletal Fixation on Skeletal Muscle.—Immobilization of the gastrocnemius-soleus group of muscles effected by pinning of the joints, produced marked atrophy during the first 10 days, and hypersensitivity to intra-arterially injected Ach. The atrophy did not reach the degree seen in muscles paralysed by loss of their motor nerves. (W. M. H.)

Intravenous Potassium and Cortical Electrogram.—Potassium and calcium cause no change in the cortical electrogram until the development of intraventricular block or cardiac arrest, when slowing of the cortical electrogram ensues. Magnesium, on the other hand, produces transient periods of slowing before pathological changes appear in the electrocardiogram. (W. M. H.)

Auditory Nerve Fibres and Acoustic Stimulation —The activity in single fibres of the auditory nerve in cats has been studied with the aid of micro-electrodes. The fibres were excited by delivering acoustic stimulation to the ear. Each auditory nerve fibre responds only to a narrow band of sound frequencies when the sound intensity is just sufficient to excite it at all. Fibres were found which were specifically sensitive to narrow bands of frequencies in the frequency range between 420 c.p.s. and 25,000 c.p.s. Auditory fibres may discharge spontaneously in the absence of any apparent sound stimulus. After a period of activity during sound stimulation, the spontaneous activity may be temporarily depressed and then accelerated (after discharge). Auditory fibres behave much like other sensory fibres. To a continuous adequate sound stimulus the auditory fibre responds by a train of impulses gradually declining in rate. Within a few tenths of a second this rate adaptation is complete and the amplitude of the potentials is diminished. At constant frequency an increase in sound intensity causes an increase in the rate of discharge of the single fiber. Most fibres reach a maximum of 450 discharges per second after an intensity increase of about 30 db. The frequency band capable of exciting a given fibre increases as the intensity level is raised. At levels about 100 db. above threshold, tones 3 octaves below and ½ above may be adequate. The findings support the place theory that pitch depends on where, and loudness on how much of, the basilar membrane is disturbed. (W. M. H.)

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Hypothalamic Lesions and Electrical Activity.—In the isolated heart and cardiac ganglion of Limulus a direct current causes a sustained reversible increase in frequency of heart beat and changes in wave form of the electrogram. The effect is exerted locally where the current density is highest. (W. M. H.)

Excitability of Endplate Region.—Properties of the endplate-free regions were investigated in single nerve-muscle fibre preparations of the *M. adductor longus* and in isolated sartorius muscles of Australian frogs (*Hyla aurea*). Ach. nicotine and caffeine set up impulses by depolarizing the muscle membrane at the endplate region. Effects are not found at regions free of endplates. Potassium has a depolarizing action at and away from the endplate but initiates impulses at the endplate region only. Curarine opposes the depolarization and excitation caused by these drugs, excepting potassium. (W. M. H.)

Reflex Action and Peripheral Source of Afferent Stimulation.—Two-neuron-arc reflex discharges in the dorsal root-ventral root reflex are secured by stimulation on the lowest threshold fibres of the dorsal root. Stimulation of the higher threshold fibres is primarily responsible for the multineuron-arc reflex discharges. The fibres mediating direct excitation and direct inhibition to the motoneurone are functionally indistinguishable in the dorsal root. Most of the connections to interneurons come from the cutaneous nerves. Thus, two neuron-arc reflex discharges are produced by stimulation of muscle nerve and multineuron-arc reflex discharges by stimulation of cutaneous nerves. (W. M. H.)

Functional Organization of Temporal Lobe.—The temporal lobes of the macaque and chimpanzee show similar tonotopic features. The acoustic sector consists of the primary area 41, a small area 52 around it and area 22 mutually spiking each other. With strychninization the areas of the temporal sector, 21, 20, and 38 are shown to fire only locally. The commissural connections between the two temporal sectors are restricted to area 21 and 90 by the anterior commissure. (W. M. H.)

Long Association Fibres in Cerebral Hemispheres.—In the macaque and chimpanzee the homologues of well-defined long association bundles of the human cortex have been demonstrated by recording the electrical activity promoted at a distance by local application of strychnine. (W. M. H.)

Interaction of Antidromic and Orthodromic Volleys.—Antidromic volleys may fail to conduct from the axon into the soma in some motoneurons. Thus a maximal antidromic volley back-fired into a segmental spinal pool of motoneurons fails to block a reflex volley completely unless the opposed volleys clash in the motor axons. The recovery curves show first the axonal recovery in motoneurons of which the somata are not activated by the antidromic volley, and then the recovery of synaptic transmission through the motoneurons with somata affected by the antidromic volley. Conduction in the neuron soma is accompanied by refractoriness. (W. M. H.)

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SCHWEIZER ARCHIV FÜR NEUROLOGIE UND PSYCHIATRIE

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Traumatic Encephalopathies.—(1) Morsier, in a general survey of the traumatic encaphalopathies, stresses the importance of the zones of vulnerability from points of impact and the frequency of lesions in the hypothalamic and midbrain regions. These may be large and fatal or small (perivascular hæmorrhages, etc.) causing neuro-vegetative troubles in the cases that recover. He distinguishes between reversible and temporary and irreversible permanent changes. Very complete and prolonged rest is indicated in these cases. (2) Rey, on the psychological study, points out that psychological tests must be suitable for the intellectual attainment of the person before the accident. Difficulty of hearing and attention difficulty and slowness on the work, marked psychological changes, with character changes which may be increased by these patients' impatience with themselves. (3) Jentzer describes small hæmorrhages in the dura and the suitability in some cases of operative treatment. (4) Brun tends to regard the psychological and physiological changes as hysteric in the "Charcot" sense rather than due to cerebral trauma. (G. M. G.)